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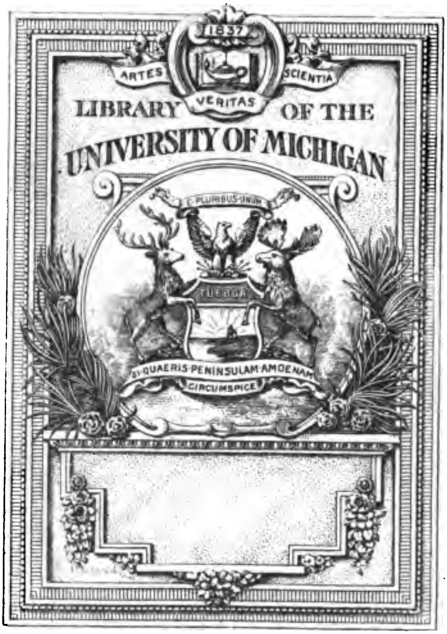
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NOTES

ON THE

MANUFACTURE OF POTTERY

AMONG

SAVAGE RACES

BY

Ch. Fred. Hartt, A. M.

CHIEF OF THE GEOLOGICAL COMMISSION OF BRAZIL

Printed and published
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Notes on the Manufacture of Pottery among Savage Races

Since the art of manufacturing pottery is intimately connected with the preparation and serving of the food of man, it is of the highest economic importance, and the history of its origin and evolution, and the discussion of the processes it involves must greatly interest the ethnologist.

There was a time in the history of every people when pottery was unknown. — When was it discovered? Did it originate at a single point on the earth's surface, and thence spread among the nations, or did its use spring up independently in different parts of the world? — These and other questions strongly engage the attention of the student of man, and demand investigation. But there is another point of view from which the study of pottery becomes yet more attractive, for, with ceramic art, is closely connected the evolution of ornament, of painting, of sculpture, and even of architecture. It is therefore of interest to the historian and the student of art.

Until recently, however, ceramists have almost exclusively devoted themselves to the study of the pottery of advanced nations, and though that of primitive peoples has largely been collected, it has not been critically studied, and the investigation of the fictile art, in its beginnings and earlier stages of growth, has been quite as much neglected, as was the embryology of the animal kingdom before the time of von Baer, and Agassiz.

As the stages of growth of an individual animal may be determined by the study of many individuals in different degrees of development, so may the progressive steps in the evolution of an art be traced out, with greater or less accuracy, by examining that art as practised by peoples of different states of advancement. Materials for the study of pottery in this way are wanting, not only because the collections are insufficient, but because the study of an art involves the investigation not only of the products and their applications, but also of the processes employed in its practise.

In examining ethnological works and books of travel, it is really surprising to observe how exceedingly meagre is the information relating to the pottery of uncivilized tribes, and how extremely few are the observations recorded concerning the materials used, and the methods employed in its fabrication. Even the most intelligent travellers usually content themselves with merely a passing remark on the earthen ware of the tribes they visit, and it is very rare that one finds any description whatever of the manner of building up a vessel. (1)

In making a critical study of the Indian pottery of Brazil, both ancient and modern, I have been led to investigate some facts in connection with the methods employed in primitive ceramic art, which, up to the present time, have received but little attention.

My studies were at first confined to the aboriginal pottery of Brazil, but they finally took a wider range, and, with a view to making myself acquainted with the development of the art among the uncivilised peoples of other countries, I have as carefully as possible, collected from the works at my command, facts relative to pottery made without the aid of the wheel all over the world, examining in the course of these investigations hundreds of volumes, scattered through many libraries. Some of the more important of the conclusions reached by a study of ceramic ornament have been already briefly sketched in a paper on «Evolution in Ornament», (1) in which I have attempted to show the origin and function of Decorative Art, and describe some of the more important steps in the growth of those ornamental borders so common on pottery, and known as frets, scrolls, and honey-suckle patterns.

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(1) This is probably, in great part, to be accounted for by the fact that the earthen-ware is made by the women, and usually in their quarters. One might travel long on the Amazonas without having an opportunity of observing the making of pottery.

In the present paper I shall limit myself to a brief consideration of the origin of ceramic art, of the materials in use for the making and finishing of pottery, and of the methods followed in the building up of a vessel; and, finally, I shall attempt to show that the manufacture of pottery, being intimately connected with the labors of the kitchen, belongs, the world over, among savage tribes of a certain state of culture, to woman, a fact which, owing to the intimate relation existing between pottery and æsthetic art, has, it seems to me, a high significance.

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(1) Popular Science Monthly, January, 1875.

The use of pottery is unknown to many savage peoples, as for instance to the Esquimaux, the Northern Indians of North America, the Botucudos (1) and Cayapós (2) of Brazil, the Pampean races, the Fuegians, the Veddahs of Ceylon, the Andaman Islanders, the Australians, the Maories, and the Polynesian islanders generally. In some cases this ignorance of the art may be accounted for by the exceedingly low degree of culture of the tribe, as among the Botucudos. In Greenland, where an extremely low temperature prevails, vessels of clay would not be very serviceable, because of the liability of their being broken by the freezing of the contained liquid. Moreover, during the greater part of the year, the soil is frozen, and covered with snow, so that it would be difficult to obtain clay, and fire wood is so scarce that cooking must be done over a lamp.

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(1) My friend Mr. George Schieber, who intimately knows the Botocudos of the Mucury District, assures me that pottery is really unknown to these Indians.

(2) I am informed by Dr. Couto de Magalhães that the Indians belonging to the great family of the Cayapós, cook only by roasting or boucaning, never boiling their food. Among these Indians studied by Dr. Couto de Magalhães, may be mentioned the Gradahús, the Gurutirés of the Xingú, the Carahós of the sertões of Maranhão and the Cayapós of Matto Grosso.

In such a country we should scarcely expect the manufacture of earthenware to flourish,and its absence among the Greenlanders is compatible with a considerable advance in other arts, as is seen in the construction of houses, sledges, kajacks, &c, and in the ornamentation of weapons and other objects.

Among the Algonquin tribes of Canada and the North Eastern United States, cooking is often done in vessels of bark, either by placing the vessel over the fire, or by putting hot stones into the liquid. (1)

I have seen the Micmac Indians of Nova Scotia make square, or oblong vessels of the extremely thin, paper-like bark of the birch, (*Betula papy-*

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(1) «Ils faisoyent cuire leur chair dans les plats d'escorce, qu'ils appellent *ouragana* », *Relations des Jesuites*, tom. I, *Relation de la Nouvelle France, en l'année 1633*, p. 4.

(2) Jones Smith's Report, pp. 66, 321.

racea, Ait), and cook in them directly over the fire, just as water may be boiled in a paper cup. The Kutchin tribes (2) of the Mackenzie River have no pottery, but they make kettles of tamarack roots, woven together very tightly and neatly, and ornamented with dyed porcupine quills, in which vessels they boil water with hot stones.

The Indians of the Island of Santa Catalina, in California, «brought fresh water to the Spaniards in flaskets made with rushes». (1) Similar vessels are still in use in the same region, and Major Powell brought home from the Colorado, water baskets lined inside with pitch. The Maués of the Amazonas use water tight baskets, and so also do the Kaffirs. Wooden kettles for stone-boiling are found among many tribes both in America and elsewhere, and the inhabitants of Amboyna and Ternate cook in bamboos. (2)

The possession of a material like birch-bark may render pottery to a certain extent unnecessary and thus retard its invention and adoption.

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(1) Burney, Second Voyage of Sebastian Vizcaino. South Sea Described, p. 248.

(2) Recueil des voyages qui ont servi á l'établissement de la compagnie des Indes Hollandaises, t. III, p. 322. Chardin, t. IV, pp. 171, 172.

The whole subject of cooking in wooden vessels, and of stone-boiling, has been admirably discussed by Tylor (1), and I do not propose to enter into it here.

That the inhabitants of the coral islands of the Pacific should be without pottery is not wonderful, since these island are exclusively composed of calcareous materials, out of which pottery could not be made. It is said also, that there is no potters clay in the Sandwich Islands.

The necessity for vessels for holding, not only liquids but solids, man shares with the lower animals, and, as he was not the first architect, he was not the first to mould vessels of clay. Many animals build nests of mud, and certain species of wasps construct, of the same material, globular cells with a short neck and outward turned lip, in shape exactly like some of the water-jars in use on the Amazonas. According to Packard, (1) the cell o *Eumenes fraterna* Say, a North America wasp, is made of little pellets of mud, and is as big as a cherry. Similar nests of certain South American species of wasps have been described and figured by Mr. Bates.

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(1) This paper has been written in Rio, almost entirely from MS. notes made before leaving the United States. I had intended referring largely to the works of Tylor, Lubbock, Wilson, Jones and Rau, to all of which I am indebted, but they are at present inaccessible to me. I ought to state that I have taken but little at second hand, having been to the pains, in almost every case to look up and examine the original document. As this paper will, by and by, appear in a more extended form as a chapter of a book on Brazilian Antiquities, I hope to be able to remedy deficiencies at present unavoidable.

It is noteworthy that, in the clay wasp nests collected by Mr. Branner at Rio de Janeiro, the material is not homogeneous, but consists of a mud mixed with grains of sand, some of which are so large as to be a sufficient burden for a wasp. (2) Man is not the only animal that makes vessels of clay, but he is the only one that bakes them in the fire to make them durable. Other animals make nests of clay for their young, but primitive man uses earthenware vessels in which to hide away his dead. Man's most primitive vessel was his hand, but leaves, shells, bark, tough skins or shells of fruits, sections of bamboos etc., etc., were soon used, as by means of these, he could not only dip up water, but also transport it from place to place. The same vessels must also have served for the preservation and transportation of articles for food, etc.

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(1) Guide to the Study of Insects, p. 156. pl. 5 fig. 15.

2) Mr. Branner, who had been studying these wasps, tells me that the mouth of the nest is left open so long as the larva is being fed by the mother, but so soon as it has pupated, the neck and lips are cut off and the mouth is closed.

The discovery of some means of procuring fire, and the adoption of the latter in the preparation of food, must have everywhere preceded the invention of pottery. Unbaked clay is fragile and of no use for preserving liquids, and moreover, sun dried vessels have, so far as I know, never been found in use by a people that did not use burned pottery also. (1)

Fire must have been procured and cherished, originally, for the sake of its warmth, and some considerable time must have elapsed before, in the first place, even the idea of cooking food by boiling suggested itself. The fictile art had its origin in the progressive steps taken by primitive man to make vessels, that would not only hold liquids, but also withstand the action of heat.

Boucher de Perthes thought that primitive man first used « auges creusées dans le bois même, dans les pierres tendres, le gypse, la craie. La rupture fréquente de ces meubles a donné l'idée de rapprocher les parties, puis de les lier par une couche terreuse. C'était un premier effort vers l'art de la poterie, et c'en fut un second de reconnaître que cette terre pouvait servir à les égaliser, à les rendre plus solides et à en cacher les imperfections, ou à en boucher les fissures. » (1)

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(1) The only vessels of unbaked clay I have seen on the Amazonas are the little cups used to collect the milk of the caouchouc.

It is so much more easy to supply one's self with drinking vessels from the vegetable kingdom, that I am inclined to doubt whether stone cups and vessels were largely used before the invention of pottery, and Boucher de Perthes' suggestion, that the invention has its origin in the use of clay for the plugging or mending of vessels of wood or stone, does not strike me as of much importance.

The art of pottery has doubtless originated independently in many different nations, and many circumstances may have led to the employment of clay for the manufacture of vessels.

Before pottery was invented, the savage doubtless already possessed the idea of a vessel, and, acquainted as he must have been with the use of fire, he probably knew the value of cooked food. He must have known that water might be heated, and that it might be made to boil, by pouring it upon a heated stone, or he may even have practised the art of stone-boiling, by putting the heated stone into the liquid. He must also have been familiar with the fact that soft clay, or mud, dries and hardens in the sun, and, when placed in the fire, becomes hard like stone, resisting thereafter the action of water.

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(1) Antiquités celtiques. tome I. ch. V p. 73.

Sir John Lubbock (1) has suggested three ways in which pottery may have been invented. At Unalashka, Capt. Cook (2) saw vessels « of a flat stone, with sides of clay not unlike a standing pye.» Sir John thinks that, after using clay to raise the sides of «their stone vessels it would naturally occur to them that the same material» would serve for the bottom also, and thus the use of stone might be replaced by a more convenient material; but it seems to me that these vessels are admirably constructed for cooking over a lamp, and that the stone bottom, in this case, is really an improvement over that of clay Lyons says (1) that the Esquimaux women have an ingenious method of making lamps and cooking pots of flat slabs of stone, which they cement together with a composition of seal's blood applied warm, the vessel being held, at the same time, over the flame of a lamp, which dries the plaster to the hardness of stone, and, in a note, he adds that « the cement is composed of seal's blood, of whitish clay and of dog's hair. The natives think that the hair of a female dog would spoil the composition and prevent is sticking. »

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(1) Prehistoric Times, p. 482.

(2) Cook's Voyage to the Pacific Ocean, Vol. II. p. 510.

On the Lower Murray the natives line a hole in the ground with clay, and cook their food in it, and sometimes they coat wooden vessels and gourds with clay, to prevent their being burned. Both these customs, just described, might, according to Lubbock, lead to the invention of pottery.

It is not at all unlikely that the idea of making a vessel entirely of clay may in some cases have been suggested by the lining of a basket with that material, this coating on drying being very likely to shrink away from the basket so as to admit of being taken out.

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(1) Private Journal, p. 320.

It is hardly worth while here to speculate further on the origin of pottery. Like other human arts, it is the result of a long evolution, and its simple beginnings we may never be able to find out. How many trials and failures must have been made before the kinds of clay, best fitted for the purpose, were discovered, and before the art of tempering the material with the proper *dègraissants* was learned! When once, however, the ceramic art had taken root, it flourished in proportion to the evolution in culture of the people itself, and to-day we find it existing in all stages of development, from that which produces the inelegant, coarse, unornamented ware of the savage, to that affording the costly and beautiful Sèvres.

The ware of our tables, and that which, in the shape of vases and other ornaments, adorns our houses, instead of being of modern, independent growth, are the true lineal descendants, through long ages of evolution, from the pottery of the savage. No wonder then that the study of ceramic art should be so attractive!

The material of which pottery is

made is clay. This is not a substance of a well defined chemical constitution, but one varying greatly in the ingredients of which it is composed. Ordinary clay consists of fine particles of more or less decomposed feldspar, mixed with a larger or smaller percentage of free silica, which last may exist, either as an impalpable powder, or as a more or less coarse sand.

Kaolinite, used in the manufacture of porcelain, is a silicate of alumina derived from the decomposition of a feldspar containing soda or potash, and it consists mainly of a mixture of silicate of alumina and free silica.

Pure clay will not make pottery, because of its tendency to shrink and crack in drying and baking. It must therefore be mixed with some substance to counteract this tendency. In the making of sun-dried bricks the Egyptians found it necessary to mix the clay with straw.

In pottery, the substance added is called by the French a *dégraissant*. One of the best materials for this purpose is sand, or powdered silica in some form, especially if the ware is to be burned at a high temperature.

The Danish archæologists have shown that the clay, of which the pottery of the Kjœkkenmœddings was made, was mixed with powdered granite, apparently obtaining by heating the rock and plunging it into water. In Chiloë to-day, the natives obtain a *dègraissant* for pottery in the same way. (1) In some kinds of earthenware manufactured in England and on the continent, powdered flint (2) is added to the clay, the flints being prepared by heating them red hot, then throwing them into water and afterwards pulverising them.

Sometimes a «cement» of pulverized pot-shreds, or *terra cotta*, is added in the manufacture of certain kinds of modern pottery, both among civilized and savage nations. In making, for metallurgical purposes, crucibles (3) that are required to stand great heat and sudden changes of temperature, burnt clay, obtained by powdering old crucibles, is sometimes added to the raw clay to prevent cracking. (4) The ancient Indians of Pacoval, on the Island of Marajó, used to mingle powdered pottery with the clay for their ware, and, in the mass composing the walls of fractured specimens obtained from Sr. Ferreira Penna, I have found quite large fragments, still showing their painted surfaces.

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(1) Wagner, Chimie Industrielle, Tom. 1. p. 555.

(2) Brongniart. Arts Céramiques 1854. J. I. p. 71.

(3) Fonck. Zeitschrift f. Ethnoelogie, II. Jahr. 1870. Heft. IV. p. 290.

(4) Ure, Dictionary, *sub voce* Pottery. See also Brongniart. Arts Céramiques. T. I. p. 72.

In both North and South America, where the Indian pottery is rarely ever thoroughly burned, the clay is often mixed with broken shells. Mica enters frequently into the composition of pottery, and Dr. Behrendt, the celebrated ethnologist, has informed me that, in Yucatan, even wash gold (1) was occasionally used.

Powdered coke or furnace cinders, graphite, amianthus (2), and even sawdust are employed in some kinds of modern European pottery, and, where a low heat is used in baking, the clay is sometimes mixed with powdered limestone. At a higher heat this latter would serve as a flux.

I am not aware that the Indians of North America ever mixed ashes with the clay, but the custom is very general in South America, where the ashes of the bark of several trees are employed. In Guiana the bark used is that of the Couepi tree—*Couepia Guianensis* (1).

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(1) Gold is found in the material composing the pottery of Palembang in the East Indies. *Journal of the East Indian Archipeago.* 1850, Vol. 4, p. 273.

(2) Brongniart. Arts Céramiques. T, I. p. 74.

On the Amazonas the clay intended for the manufacture of pottery, is mixed with the ash of the *Caraipé* (2) tree, *Moquilea utilis* Hooker Fil. The Carajás, Caraja-ís, Chambioás, Chavántes, Cheréntes and Guajajáras of the Araguaya, according to Dr. Couto de Magalhães, mix with the clay the ashes of certain sipós. I have seen the Caraipé bark prepared by stacking the fragments on end in a conical heap, and then burning them in the open air. The ash is very abundant and preserves the original form of the fragments. Having been reduced to powder and sifted, it is thoroughly intermingled with clay, to which, when wet, it gives a dark plumbaginous look, but this color grows much lighter on burning. The use of the *Caraipé*, according to universal testimony, makes the ware better able to stand the fire. The Indians of Sariacú use the ash of a bark called *Apacaráma* (1) perhaps the same as the *caraipé*. Prof. Chas. Schaeffer, of the Chemical Laboratory of Cornell University, has had the kindness to analyse for me a specimen of the caraipé bark, which he found to contain an enormous percentage of silica, which separated as a fine white powder. It is to this siliceous powder that the ash doubtless owes its value as a *dégraissant*. In the Amazonian region is found a species of fresh-water sponge called *Cauxi*, containing siliceous spicules, and whose ash, according to de Souza, (1) is sometimes used to temper clay for pottery.

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(1) « La vaisselle chez eux, consiste en toutes sortes de pots, de plats et de jattes, de terre presque aussi durables que le cuivres fabriquées de la façon suivante. Les femmer (car comme j'ai dit plus haut, c'est leué occupation) prennent une certaine quantitu de cindres de l'écorce d'un arbre, conn dans cette contrée sous le nom de *Kweepi*, qu'elles passent au travers d'un tamis bien fin, qu'elles mêlent ensuite avec de la bonne terre grasse, pour en former tous les utencils indiqués ci-dessus : qu'elles font d'abord sécher à l'air, après quoi elles les mettent au feu pour les cuire et leur donnent un très beau vernis.»

Ferdinand Fermin. Description génerale, Historique, Géographique et Physique de la Colonie de Surinam. Tome 1er., p, 61.

(2) *Licania floribunda.* Benth. Martius. Flora Braziliensis. Fasc. XLI. Pl. 8, f. 11.

Wallace writes *caripé.* Travels on the Amazon and Rio Negro, p. 484.

Marryatt speaks of the *carisse* or pottery tree of Pará. "Pottery and Porcelain" p. 509.

The caraipé bark is, as Bates has remarked, an article of commerce on the Amazonas. A Naturalist on the Amazon. p. 225.

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(1) Smythe and Lowe. Narration of a Journey from Lima to Pará. London, 1836. p. 210.

According to Semper, (2) the use of these *dégraissants* and cements, besides destroying the homogeneity of the paste, furnish innumerable points of rest throughout the mass that reduce the fragility of the ware after burning, and the danger of cracking, whether through change of temperature or by shock.

The coarser particles, according to the same author, serve to break up and distribute the undulations by which cracks are propagated, very much as a fracture in a pane of glass may be arrested by boring a hole at the extremity of the crack.

Before the advent of Europeans, pottery in America was invariably made by hand, the potter's wheel being unknown.

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(1) Lembranças e Curiosidades, etc., do Amazonas. p. 101.

(2) «Diese grobkörnigen, oft fremdartigen, feuerbeständigen Beimischungen der Paste heben die Homogenität der letzteren auf, aber in kontinuirlicher Weise in der Masse, die Zerbrechlichkeit derselben, nach ihrem Brennen und die Gefahr des Springens, sei es durch Temperatur-wechsel oder durch Schock, vermindern, weil die gröbern Elemente die in der Masse vertheilt sind, die regelmässigen Schwingungen unterbrechen, welche den beginnenden Riss fort pflanzen, indem sie strahlenformig die Masse durchfiebern. Jene gröberen Bestandtheile vertreten denselben Dienst wie die Löcher, die man in Spiegelscheiben am Ende eines Risses bohrt um ihn zu verhindern weiter zu gehen.»—Semper. Der Stil. Band II. S. 122.

In the province of Pará, I have had frequent opportunities to observe the manufacture of pottery, by the Indian women, from a plastic, light gray kind of clay found in the alluvial bottoms. Among the Indians, and to a considerable extent also amongst the whites, as each family makes its own pottery, stores of this clay are often laid up, and, in Indian houses and on fazendas distant from town, it may often be seen preserved, dried in large balls. The process of building up the vessel is as follows:— The clay, having been mixed with *caraipé*, is kneaded with the hands into a mass, which is then, according to Dr. Pimentel, sometimes divided into a number of small balls about as large as the fist. The woman potter then furnishes herself with a board or mat, on which to build up the vessel, some flat object on which to roll out the clay, a vessel of water, and a fragment of a *cuia* or a shell to serve as a smoothing instrument. If the vessel is to have a flat bottom, she presses out upon the board a round, flat piece of the required size and thickness. This takes an impress of the board or mat, and fragments of the bottoms of vessels from the ancient site of the «Bluff Dwellers» at Taparinha near Santarem are often beautifully impressed by the mat, on which they were formed. Dr. Pimentel tells me that, in beginning a pot, the Indian women of Santarem sometimes seat themselves on the ground holding a large ball of clay between the feet. On this the vessel is built up, the ball being afterwards cut off, leaving the bottom flat.

In all cases the walls are fashioned in the following manner:

A piece of clay is formed under the hand into a long, rope-like cylinder, in the same way as putty is rolled out by the glazier. This rope of clay is then coiled round the edge of the bottom of the vessel, being flattened sideways by pinching with the fingers of the left hand, and caused to adhere to the bottom. On this first addition, coil after coil is laid, in like manner, each being flattened as before.

After a few have been added they are worked into shape with the fingers, which are occasionally moistened in water, and the irregularities produced by the coils are caused to disappear. The vessel is formed by the hand alone, and the surface is smoothed down by means of a bit of gourd or a shell, which is from time to time dipped in water. If the vessel be large, it is now set away in the shade, for a while, to dry a little, after which new coils are added as above, no other instruments being used except the hands and the gourd or shell, with which alone the vessel may not only receive an extremely regular form, but also a very smooth surface. (1) The coils are so worked together that, from a simple inspection of the vessel, it is impossible to determine how it was built up. I should never have suspected that the pottery of Pacoval had been made by coiling, were it not that I found the coils still ununited on the inner surface of the heads of idols, which had been built up from below, and closed in at the top. The coils still preserve the delicate imprints of the fingers of the artist. (2)

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(1) Dr. Couto de Magalhães tells me that the pottery of the Carajás, Carajáis, Chambioás, Chavántes, Cheréntes, Guajajáras of the Araguáya River is always made by coiling, the surface being worked down by the hand and water, and the aid of a sort of spoon-like trowel made of bamboo.

(2) See my paper on the Ancient Indian Pottery of Marajó. American Naturalist. Vol. V 1871.

In building up a vessel, care must be taken to allow it to harden as the process progresses, to as so avoid its settling by its own weight, as it is very likely to do, especially if the vessel be large. This settling under the influence of gravity is however likely to give rise to graceful curves, and it would be interesting to determine how far the beauty of outline of pottery may not have resulted from the imitation of forms that have originated in this way.

Handles, and all prominent ornaments are added afterwards, being luted on, and this is the reason why, at Pacoval, they are usually found detached. Sometimes the outside of the vessel is ornamented by applying thin strips of clay (1) laid on in spirals and other figures.

The ancient Bluff-Dwellers were very fond of ornamenting their pottery in this way. The « apple pie » border, made by impressing with the extremity of the finger, or by pinching up a line of elevations between the thumb and fore-finger, was also in common use among the same Indians, and is still perpetuated on the modern pottery of the Amazonas. (1) It was rarely used by the Indians of Pacoval.

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(1) The same method was employed by the ancient Greek and Roman potters.

In Amazonian pottery, ornaments are rarely ever impressed or stamped. I have observed on the Bluff Dwellers' pottery, circles made with the end of a hollow stick, and Dr. Couto de Magalhães tells me that the Chambioás and Carajás of the Araguaya make wooden dies, with which to ornament their pottery. The figures are represented as being very simple, the one in use by the Carajás being a sort of Maltese cross.

The surface of the vessel, after having been smoothed down, is often washed with a thin layer of pure, creamy clay, which appears to be sometimes burnished before cooking, producing a beautiful, hard.and almost polished surface. The common ware of the civilized Indians of the Province of Pará is usually very plain and rarely ever painted, but that of the upper Amazonas is often most beautifully ornamented in several colors, with frets, and borders, and other purely aesthetic forms, the absence of all attempt at representations of plant-forms being remarkable. (1)

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(1) In the use of this and other ornaments by women to day in the making of pastry, it is curious to observe her perpetuating forms that originated in ceramic art.

The ancient pottery of Pacoval is often adorned with frets and scroll borders and other ornaments, drawn on a white ground with marvellous accuracy. (2)

Ornaments are sometimes scratched with a sharp point on the surface of modern Amazonian pottery, and, occasionally, ornaments are made co sisting of a series of holes. The etching on the Pacoval pottery is exceedingly delicate. Sometimes this same pottery is decorated by first washing the surface with white clay, and then engraving so as to leave an ornament in relief. The instrument used seems to have been a tooth of a paca, or some other rodent. Some of the large burial vases are completely covered with ornaments of this kind, which must have required long and patient labor.

Before burning, the vessels are allowed to dry slowly in the shade, and afterwards in the sun. The burning requires much care, and is performed in different ways. Usually, they are at first set at a distance from the fire, and allowed to become heated gradually, without actual contact with the flame, after which they are surrounded by fire and thoroughly burned. Very often they are covered over with a heap of *Caripé* bark which is set on fire. (1) Sometimes, on the Amazonas, pottery is burned in an oven, or in a hole in the ground. (2) The enormous earthen pans (*yapóna*) on which farinha is cooked, and which are sometimes four or five feet across, require to be burned with great care, and their manufacture is usually entrusted only to women of much experience. Ordinarily the pottery of the Amazonas is not thoroughly cooked. That of the Bluff-dwellers is particularly poor in this respect. While the vessel is still hot after burning, it often receives inside a coating of melted *jutahy-sica* resin (1) applied with a swab, but I am informed that before the vessel is used on the fire, this is first burned out. This resin is said to be obtained from the Jutahy tree of the Amazonas, *Hymenaea Courbaril;* (2) but it does not appear to be the product of the Jutahy alone, for Dr. Pimentel has presented me with a beautiful lip-ornament, which he says was formed in a mould, from exactly the same resin obtained from another tree.

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(1) I have not witnessed the process of painting a vessel on the Amazonas. Edwards says that the colors are laid on with a brush made of the spine of a palm. He describes the black color as being made with the juice of mandioca. *A Voyage up the Amazon* p. 114.

(2) Hartt «Ancient Indian Pottery of Marajo», American Naturalist, Vol. V. 1871 and «Evolution in Ornament», Popular Science Monthly Jan. 1875.

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(1) Catalogo da Segunda Exposição Nacional. Rio de Janeiro. p. 672. Tribu Mariaránas.

(2) Dr. Couto de Magalhães tells me that the Carajás, and other tribes of the Araguaya burn their pottery in ovens made by hollowing out the nests of the white ant. An excavation is first made in the side, which is heated by a fire. The ware is then introduced, another excavation is made below for a fire, and still another in the top of the nest, which last serves as a chimney.

At Brêves, on the Island of Marajó, there is made a kind of pottery which is first washed with white clay, and after burning, painted in water color in the most gaudy and outrageous fashion. Over this color a varnish of *jutahy-sica*, dissolved in alcohol, is laid. A similar resin, said to be the product of the same species of *Hymenâea* is used to varnish painted ware among the Maypures on the Orinoco. (3) According to Dobritzhoffer, (4) the Abiponian women rubbed their pottery with a kind of glue to make it shine. The Indians of Guiana paint their pottery with water color, and varnish it with the gum *simiri(Simiri tinctoria)*, or *bourgoni*, *(Robinia bourgoni.)* In Yucatan, Behrendt reports the use of a varnish made from the Niin *(Coccus Axin* Lallave). The Fijians glaze their ware with a resin, and the ancient Egyptians sometimes painted pottery in distemper, and covered it with a resinous varnish. (1)

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(1) Dr. Couto de Magalhães says that the Araguayan Indians do not use the resin.

(2) Treasury of Botany. Sub voce *Hymenaea.*

(3) Humboldt. Personal Narrative. Vol. II. p. 309.

(4) History of the Abipones. Vol. II. p. 131. I suspect that the word rendered glue has been incorrectly translated and I would suggest a comparison with the Latin original. See note by Codazzi farther on.

V. Martius alludes in general terms to the mode of building up of an earthen vessel by coiling, (2) and the same method appears also to have been alluded to by Humboldt (3) when he says that the natives of the Maypures on the Orinoco, «purify the clay by repeated washings, form it into cylinders, and mould the largest vessels with the hand.»

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(1) Chamber's Encyclopoedia. Sub voce «Pottery». Williams and Calvert. Fiji and the Fiji Islands, p. 53.

Jenkins' United States Exploring Expedition. p. 347.

(2) Birch, Ancient Pottery and Porcelain. Vol. I pp. 48.49.

Also Brongniart, Arts Céramiques, J. I. p. 502.

(3) «Das Formen geschieht bei allen rohen Stammen durch Einanderlegung dunner Thoncylinder um ein gemeinschaftliches Centrums, die dann zusammengestrichen und innig mit einander verbunden werden.»

V. Martius. Ethnographie Amerika's.—S.712. Personal Narrative. Vol. II. p. 309.

We meet with the same method again in Chiloë, (1) where it has been described by Dr. Fonck who speaks of the vessel as being built up exactly as at Ereré, a flat piece being first made for the bottom, on the periphery of which the wall is formed by coiling up a sausage-shaped cylinder. He adds that the ware is dried in smoke before burning.

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(1) In Chiloe hatte ich Gelegenheit, die Anfertigung der irdenen Töpfe, welche jetzt noch eben so wie vor Zeiten im Gebrauch sind, zu sehen, sie geschiet ohne Töpferschiebe: der angemachte Thon wird mit einem grobkörnigen Pulver, welches man durch zerstossen von stark glimmerhaltigen und vorher im Feuer geglühten Granitsteinen erhalt, gemischt. Alle alten Topfscherben enthalten diese Beimischung und soll in der That der beste Thon ohne dieselbe unbrauchbar sein. Aus dem gerichteten Teige rollen sie lange, wurstähnliche Rollen mit dem Handen aus nehmen darauf ein rundes glattes Stück zum Boden des Topfes und legen auf dem Rand eine jener Rollen rund herum in dem sie mit den Fingern das Stück seitlich platt drücken und die Fugen zusammenstreichen. Darüber legen sie dann ebenso eine zweite Rolle, auf diese eine dritte und so fort, bei das Gefäss im Rohen gebildet ist.

Dann werden noch die Fugen zwischen den Rollen in-und auswendig mit einer Culerg genannten Muschel geglättet und schliesslich die Töpfe im Rauche getrocknet und am offnen Feuer gebrannt. » Dr. Fonck. «Die Indier des Südlichen Chile von Sonst und jetzt.»

Zeitschrift für Ethnographie, II Jahr. 1870. Heft. IV. S. 290.

sent le dedans et le dehors du vase qu'elles ont dessein de former, qui sans cette attention serait tout ondulé. Par cette méthode elles font toutes sorte d'utenciles de terre, des plats, des assiettes, des terrines, des pots, des cruches dont quelques-unes contiennent des quarante et cinquante pintes. La cuisson de cette poterie ne leur coûte pas de grandes préparations. Après l'avoir fait sécher à l'ombre elles allument un grand feu; alors qu'elles croient avoir autant de braise qu'il leur en faut, elles nettoyent une place au milieu, y arrangent leurs vases, et les couvrent de charbons. C'est ainsi qu'elles leur donnent la cuisson dont ils ont besoin ; après cela ils peuvent aller au feu, et ont autant de consistence que les nôtres. Il n'est pas douteux que l'on ne doivent attribuer leur fermeté au melange que font ces femmes de la poudre de coquillages avec la terre qu'elles emploient. »

Prof. Rau is of the opinion that the building up of pottery by coiling was practised over a large area in North America. Certainly in South America it was widely known. This custom may perhaps be advanced as proof of a common origin for the people that practice it, but a little consideration will show that when a vessel is to be built up by hand, without the use of a mould, this method is likely immediately to suggest itself. The wasp raises the wall of its jug-like cell by the addition of pellets, which are sometimes smoothed down only on the inner surface, but for the potter to build up the wall of a pot by adding small lumps of clay, would be difficult and tedious, since it is not so easy to give a regular thickness to the wall as by the other method. To prepare a strip, or roll, is therefore so natural, that I cannot help thinking that it would be likely to suggest itself to any maker of pottery, so that the art might have arisen independently even in different localities occupied by the same tribe.

Prof. Eggleston of Columbia College, New-York, informs me that, in Germany, the large crucibles used in smelting are, when broken, built up again with ropes of clay. In this case we may have either a survival of an old pre-historic art, or its rediscovery in modern times.

I remember an idea current among children in Nova Scotia, that jugs were made with a rope, and it has suggested itself to me that this idea

Gilì (1) describes the process of coiling as found among the Indians of the Orinoco, and adds that the surface of the vessel is worked down with a pebble and the fingers, which are from time to time dipped into water, the ware being burned in pits with a fire made of bark.

Prof. Charles Rau of New York, the first ethnologist to give due scientific importance to the method of coiling, has, in his admirable essay on Indian Pottery, (2) translated the description given by Dumont of the manufacture of earthen-ware by the Indians of Louisiana, in which an account of the building up of a vessel by this method is given. As this is the best description I have anywhere seen of the moulding of earthenware by savages, I have thought it advisable to reproduce it here complete and in Dumont's own words. (3)

« Au reste, l'industrie de ces filles et femmes Sauvages est admirable, j'ai

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(1) « Dipoi, diciam cosi, si danno a filare la creta ripurgata dá sassolini, con farne con ambe le mani dé bastoncelli della grossezza del dito mignolo e di questi bastoncelli, sono composti tutti i vasi. » *Storia Americana*, T. 2. p. 316,

(2) Smithsonian Report. Washington. 1866, p. 351.

(3) Mémoires Historiques sur la Louisiane. Paris.

déjà rapporté ailleurs (1) avec quelle addresse, avec leurs doigts seulement et sans tour, elles font toutes sortes de poterie ; voici la manière dont elles s'y prennent. »

« Après avoir amassé de la terre propre pour ces sortes d'ouvrages, et l'avoir bien nettoyée, elles prennent des coquillages qu'elles broient, et qu'elles réduissent en une poudre déliée et trés-fine ; elles mêlent cette poussière trés-menue avec la terre dont elles ont fait provision, et en arrosant le tout d'un peu d'eau, elles le pettrissent avec les mains et avec les pieds, et en forment une pâte, dont elles font des rouleaux longs de six à sept pieds, et de la grosseur qui leur convient. Veulent-elles façonner un plat ou un vase? Elles prennent un de ces rouleaux par le bout; et avec le pouce de la main gauche, établissant sur cette masse le centre de l'ouvrage qu'elles veulent former, elles tournent autour de ce centre avec une vîtesse et une dextérité admirable, en décrivant une spirale : de temps en temps elles trempent leur doigts dans l'eau, qu'elles ont toujours soin d'avoir auprés d'elles; et de la main droite elles applatis-

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(1) «Voyez Tom. I. Chap. XIX. pag. 154.»

D'Orbigny (1) says that « les femmes (Chiriguanos) filent, tissent, et font des vases à contenir les boissons ». According to the same author, earthenware is made by the women among the Guarayos.

« L'industrie des Samucus », says d'Orbigny, (2) « est très bornée; les hommes confeccionnent leurs armes avec assez d'addresse, tandis que les femmes filent le coton, pour en former des espèces de filets servant de hamacs à leur maris, lorsque ces derniers vont à la chasse; elles tissent aussi la pièce d'étoffe qu'elles portent, de la ceinture au bas des jambes. Elles fabriquent de la poterie assez belle. Les deux sexes travaillent à la terre et font les racoltes ; les hommes seuls pêchent et chassent, tandis que les femmes se chargent de tous les détails du menage. » « Les femmes seules filent, tandis que les hommes tissent et font les travaux de force ».

Among the Chapacúras of Moxos, (3) while the men make their arms and their canoes, and fish, hunt, and cultivate the fields, « les femmes filent le coton, tissent les hamacs de leur maris, leur vêtements, fabriquent la poterie, et sont chargées de tous les dètails du menage. » Woman's work among the Mojos Indians comprises also the manufacture of earthenware, (1) and Gibbon (2) speaks of one Juana Jua Cayuba, a Mojos Indian woman, who superintended the hired women, who were engaged in moulding earthen jars.

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(1) L'Homme Américain. T. II., p. 339.

(2) L'Homme Américain. T. II., p. 150.

(3) D'Orbigny. L'Homme Américain. T. II, p. 233.

The Guarayos women also make pottery (3) and d'Orbigny (4) speaks of the large earthen vessels in which the dead of the tribe are buried.

Both the ancient and modern inhabitants of the Andes were famous potters, and the vases of the *Huacas* of Bolivia and Peru (5) have long attracted the attention of ethnologists. I have not been able to find a historical account of their manufacture, but something may be learned might be a reminiscence of the time when, in Europe, such vessels were actually made by coiling.

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(1) D'Orbigny. L'Homme Américain. T. II., p. 233.

(2) Report to United States Govt. of Exploration of the Valley of the Amazonas p. 246.

(3) D'Orbigny. Fragment d'un Voyage au Centre de l'Amérique Méridionale, p. 193.

(4) L'Homme Américain. T. II, p. 339.

(5) For accounts of Peruvian pottery see *von Tschudi y Rivero, Antiguedades de Peru; Catalogue du Musée Céramique de Sévres; d'Orbigny, Atlas d'Antiquités peruviennes ; Brongniart, Arts Céramiques. Tom. 1. p. 525. Also Ewbank, Life in Lrazil.*

Having now discussed the process of coiling and its distribution, I will now give such information as I have been able to gather, concerning the manufacture of pottery by the aboriginal inhabitants of America, for the double purpose of giving a clearer idea of the various processes used, and also of showing that the manufacture is everywhere exclusively in the hands of the women.

Of the pottery of Chiloë I have already given an account from Fonck. Molina (1) says that the Chilians have excellent pottery, which they burn in furnaces, or rather holes dug in the sides of the hills, and adds that they apply to their ware a sort of varnish made of a certain mineral earth. Schmidtmeyer, (2) probably referring to hand-made pottery, says that the present Chilenos are good potters for common ware: they introduce a certain quantity of earth or sand, containing an abundance of yellow mica; and jars, holding seventy gallons or more, are made by them of great thinness, lightness and strength, and which sound as if they were of metal.

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(1) «Coll'eccellente argilla, che trovasi nel loro paese, facevano delle pignate, de' piatti, delle tazze, ed anche de' vasi grandi da tenervi e liquori fermentati. Tutti questi vasi cuocevano in certe fornaci, o piuttosto in certe fosse, che scavavano nelle pendici delle colline, avevano pure scoperto il modo di applicare una sorta di vernice al loro vasellame con una terra minerale, che chiamano *«collo»* Molina, Saggio Sulla Storia Naturale del Chili. Bologna 1872.

(2) Travels into Chile. London. 1824. p. 117.

The Pehuenches of Chili are a wandering tribe. They use pottery, but Pöppig (1) says that they do not carry their vessels with them, but make new ones in every new locality in which they establish themselves.

In Bolivia, d'Orbigny says that among the Yurucarés (2) « les femmes fabriquent la poterie avec beaucoup de cérémonies superstitieuses.» According to Castelnau, (3) the Chiriguanos are excellent potters, and in each house is usually to be found a range of enormous jars for *chicha*, or maize beer. These are kept buried to the middle in the ground. One measured by Castelnau was a metre in diameter and twelve decimeters in height.

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(1) Reise in Chile, Peru, und auf dem Amazonen-Strome. Leipzig. 1835. B. I., S. 383.

(2) L'Homme Américain. T. II., p. 363.

(3) Castelnau. Expédition. T. VI., p. 56. Castelnau says that they bury the dead in these pots. *op. cit.* S. VI. p. 307.

for Prado (1) tells us that, in this tribe, were found men who affected all the manners of women, not only dressing like them, but occupying themselves in spinning, weaving, making pots, etc.

Hans Staden (2) who was a captive among the Tupinambás, relates that the women of that tribe were the potters. The vessels after having been dried in the air and painted with lines of different colors, were turned upside down upon stones, and burned by heaping bark about them and setting it on fire.

Staden speaks of the mother of Yeppipo as having, on a certain occasion, been engaged in preparing vessels for a drinking bout, and elsewhere he says that, at another time, Yeppipo proposed to bring potter's clay and farinha for a feast, showing that, instead of carrying vessels, it was more convenient to transport the clay with which to make them. Staden also speaks of the death of the woman who was to have prepared the vessels for the drinking of *cauim*, at the time when he should be killed and eaten. (1)

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(1) «Entre os Guaycurús ha homens que affectam todos os modos das mulheres ; vestem-se como ellas, occupam-se em fiar, tecer, fazer panellas, etc.» *Hist. dos Indios cavalleiros ou da Nação Guaycurú, por F. R. do Prado. Revista Trimensal do Instituto Historico. Tom I, p. 32.*

See also v. Mart. Ethnographie Amerika's. S. 74.

(2) « Mulieres vasa, quæ in usu habent, hoc modo preparant : Lutum figulinum subigunt, donec tractabile reddatur, hinc vasa diverse pro libitu instituunt, quãe ad tempus in aere siccant, et liniis versicoloribus ductis affabre distinguunt. Ubi illa iam ignibus excoquere volunt, inversa lapidibus imponunt, et circumquaque siccos arborum cortices struunt, ignemq: supponunt: quo tandem modo excoquuntur, et tam candentia, quam in quois fornace fiunt.» *Hans Staden, De Bry. Americae, Tertia pars. Lib. II. Cap. XIV, p. 3*, Compare with translation by Ternaux, p. 261 and with that in Dutch by Van der Aa.

Jean de Lery who spent some time among the Indians of the vicinity of Rio de Janeiro, gives the following account of the manufacture of pottery among them : (2)

« Au demeurant les femmes qui ont toute la charge du mesnage font force cannes et grands vaisseaux de terre pour faire et tenir le brunage dit caouïm : semblablement des pots à

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(1) To show how much the translations of Hans Staden differ among themselves, I add the following versions :—«Welke de pot had willen torrusten tot den drank, wannurmen my eeten sou.» Van der Aa, Naaukeurige versameling, etc. B. 15 S. 44.

« Qui devait fabriquer le vin qu'on boirait en me dévorant.»—Edition of Henri Ternaux.

« Haec occupata fuerat in parandis vasis fictilibus ad potiones coquendas necessariis.»—Edition of de Bry, p. 60.

(2) « Histoire d'vn Voyage » etc. 1578. de Bry, Hist. Nav. in Braziliam p. 239.

from the study of the pottery itself. In the Museum of Cornell University is a fine collection of Peruvian pottery consisting of over a hundred pieces, presented by President Andrew D. White, and of a number of jars collected in 1872 by Mr. Steere. The majority of these vessels were undoubtedly formed in two or more pieces, in a mould, and afterwards luted together. Some of the moulds were made from natural objects, such as squashes, etc., but others bear very elaborate raised figures. I venture to suggest that the mould was sometimes made of clay from a pattern vessel and then baked. (1) In this, after being greased, the clay may have been spread out somewhat thin and then allowed to dry to a consistence that would allow it to be handled without breaking or distortion. The vessels in Cornell University have certainly been burned, but von Tschudi and Rivero appear to think that this was not the case with Peruvian pottery. (2)

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(1) Moulds in terra cotta were used by the ancient potters of Europe. *Brongniart. Arts Céramiques. T. 1. p. 133.*

(2) « Die Thongefässe, welche nicht gebrannt, sondern nur an der Luft getrochnet worden zu sein scheinen, wurden zum groszen Theil in Formen gemacht, die das Gefäsz zur Hälfte umfaszten, «*Waitz, Antropologie, 446te Seite.*

The women of the Indians of the Ucayali are represented as being the potters.

The Tobas or Mbocobi of the Chaco manufacture immense chica pots like those of the Chiriguanos, (1) the work falling to the lot of the women, as was the case also among the Indians of Itaty, a village of Guaranís situated at the confluence of the Paraná and Paraguay. (2)

In his history of the Abipones, Dobritzhoffer says: (3) « The American women seem to have a natural talent for making various useful articles. They can mould pots and jugs of various forms of clay, not with the assistance of a turning machine like potters, but with their hands alone. These clay vessels they bake, not in an oven, but out of doors, placing sticks around them. »

The pottery of the Payaguás of Paraguay was the work of the women. (4) Among the Guaycurús, pottery appears to have been woman's work,

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(1) d'Orbigny. L'Homme Américain. J. II 100.

(2) d'Orbigny. Voyage dans l'Amérique méridionale. Itinéraire, T.I. p. 199, also Brongniart. Arts Céramiques. T. I. p. 530.

(3) Vol. II. p. 131.

(4) L'Art de Vérifier les Dates. J. XI. p. 209. Azara, Voyages dans l'Amérique Meridionale, T. II. p. 129.

A writer on Brazil (1) says that the older Tupinambá women made pottery by hand, as for instance vessels for making wines, some of which were big enough to hold a pipe. They also made pots, mugs, and pans. This pottery, which was sometimes painted, was burned in a pit, a wood fire being made above. They superstitiously believed that if any one but the person who moulded the pottery were to attempt to burn it, the vessels would break to pieces in the fire.

Spix and Martius (2) tell us that the Coroádo women provide the requisite earthenware for the family.

Pottery is still made by the civilized Indian women in many parts of Brazil, south of the Amazonas. My friends Srs. Bueno and Paes de Barros, of Cornell University, tell me that old women still make earthenware by hand in S. Paulo, and Sr. Bueno says that they are sometimes engaged to go to the fazendas for this purpose. He describes the clay as sometimes mixed by being trodden under the feet of oxen, the vessels being formed either by coiling or by moulding in several pieces. According to Sr. Paes de Barros, the clay is worked into a thin sheet, which is applied to the surface of a wooden mould. The outside is worked down with the wetted hand and the application of a corncob.

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(1) « As mulheres já de idade tem cuidado de fazerem vazilhas de barro á mão, como são os potes em que fazem os vinhos, e fazem alguns tamanhos, que levão tanto como uma pipa, em os quaes, e em outros menores fervem os vinhos que bebem. Fazem mais estas velhas panellas, pucaros, e alguidares a seu uso, em que comem, a farinha, e outros em que a deitão, e em que comem, lavradas de tintas de côres, e qual louça cozem em uma cova, que fazem no chão, e lançào-lhe a lenha por cima ; e tem e crêm estes indios que se cozer esta louça outra pessoa que não seja a que a fez, que ha de arrebentar no fogo, » etc. *Noticia do Brazil, na Collecção de Noticias para a Historia e Geographia das Nações Ultramarinas, etc. Lisboa*, 1825. Tomo III. Parte I, p. 286.

See also Memoria Anonyma. Revista Trimesal. Tomo I, p. 217.

(2) Travels in Brazil. London 1824, Vol. II, p. 246.

After the vessel has dried to the proper consistency, it is cut in two, the mould is removed, and the two pieces are skilfully luted together. Handles, spouts, etc., are added afterward. Sr. Aquino, formerly a student in Cornell University, says that pottery is made in the same way in Bahia.

Claude (1) d'Abbeville says, in speaking of the Indians of Maranhão, says that «Les femmes font force aussi vaismettre cuire, tant de façon ronde que ovale : des poesles moyennes et petites, plats et autre vaisselle de terre, laquelle cõbien qu'elle ne soit guere vnie par le dehors, est neantmoins si bien polie et comme plombee par le dedans de certaine liqueur blanche qui s'endurcit, qu'il n'est possible aux potiers de par deça de mieux accoustrer leurs poteries de terre. Mesmes les femmes, faisant quelques couleurs grisastres propres à cela, avec des pinceaux font mille petites gentilesses, comme guilochis, lac d'amours, et autres droleries au dedans de ces vaisselles de terre, principalement en celles ou l'on tient la farine et les autres viãdes : de façõ qu'on est assez hõnestemêt : voir diray plus que ne sont ceux qui servêt de vaisselle de bois par deçà. »

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(1) Histoire de la Mission des Pères Capuchins dans l'Isle de Maragnan, etc. Paris, 1614, Fol. 310.

Lery is doubtless correct when he says that the ornaments were drawn without a pattern, but I doubt very much if he is accurate when he claims that the women were not able to reproduce a pattern set before them.

Lery speaks of the immense pots used to hold cauim, and says that some of these vessels would hold sixty Paris pints. (4)

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(4) « Hist. d'vn Voyage, » etc. 1578, p. 142.

He describes these large vessels a « presques faits de la façon des grands cuuiers de terre esquels, comme i'ay veu, on fait la lescive en quelques endroits de Bourbonnois et d'Auuergne : excepté toutesfois que ils sont plus estroits par la bouche et par la haut. » (1)

Lery (2) describes the « poesles de terre » used in cooking mandioca as made by the women, who by the way, still continue to practise the art on the Amazonas.

The women of the Arraial do Barro, opposite the Island of São Sebastião, are said to have made, by hand, excellent vessels of earthenware. (3)

The women of the Mongoyós (4) are also reported to have fabricated good pottery. The clay is said to have been prepared upon a banana leaf, held upon the knees. It was then placed opon a « plateau » of sifted ashes and the vessel, after fashioning and polishing, was afterward submitted to the action of the fire.

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(1) Op. cit. p. 141.

(2) Op. cit. p. 133.

(3) Art. de Vérifier les Dates. T. 13, p. 110.

(4) Art. de Vérifier les Dates. T. 13, p. 208.

selles de terre de toutes sortes, de grandes, de petites, de rondes, en ovalle, en quarré, les unes en forme de plats, les autres en forme de terrines, et autres fort unies et polies, principalement par le dedans. Ils se servent de gommes blanches et noires pour les plomber au dedans, y faisant diverses figures à plaisir et selon leur fantasie. »

On the Amazonas and its tributaries, woman has exclusive possession of the hand manufacture of pottery and it is practised to some extent even by the white women. In my collection is a vessel made by the hands of Mrs. Rhome, the wife of a well-to-do planter near Santarem. Von Martius (1) long ago called attention to the fact that the pottery of Brêves was fabricated by female labor. Except in the olarias, where earthen vessels are made on a large scale, men nowhere in the Amazonian region have anything to do with this industry. I have observed women making pottery near Prainha, and at Monte Alegre, Ereré, Santarem and Itaitúba, and Mr. Steere saw them at work near Obydos; but to enumerate here in detail all the localities at which the same fact has been observed, would be unnecessarily tedious. I have, therefore, compressed and thrown together the more important of the notes I have made bearing on this subject, and they are given below. (1)

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(1) Reise, 8tes Buch, 990te. Seite. Figures of this pottery are given in the accompanying Atlas.

Humboldt (2) says that the potteries of Maniquarez in Venezuela are entirely in the hands of the Indian women, who in his time still worked after the ancient fashion. The clay they used was derived from the decomposition of mica slate, and was reddened with iron oxide; that which contains most mica being prefered. Vessels two or three feet in diameter were formed by hand with ease. They were burned in the open air by being covered with twigs of *Desmanthus cassia,* and the arborescent *Capparis,* which were set on fire.

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(1) Woman make pottery at Monte-Alegre' *Baena, Ensaio Corographico do Pará, sub voce «Monte Alegre»*, see also *Candido Mendes de Almeida, Pinsonia, 1873, p. 28 ;* at the Barreiras do Cuçary near Santarem, *Baena and Almeida, loc. cit.*, and at Saracayú. *Herndon, Exploration of the Valley of the Amazon p. 202.* Wallace reports the same custom as obtaining among the Uaupés Indians, *Travels on the Amazons and Rio Negro, London, 1853, p. 172.* The same is true of the Mundurucús and Maués (Hartt), and of the Carajaís, Chambioás, Cheréntes, Chavántes, and Guajajáras of the Araguaya (Dr, Couto de Magalhães). For further information concerning the pottery of Brazil, see *Debret. Voyage pittoresque et historique au Brésil, Paris, 1834.*, the *Catalogue de Musée Céramique de Sèvres*, and *Brongniart, Arts Céramiques.* Brongniart says (1854) that the potters of Parahyba, Bahia. and Santa Catharina, where the greater part of modern Brazilian ware was then made, were native women. *Arts Céramiques. t. I. p. 532.*

(2) Personal Narrative. Vol. I. p. 195,

Gili (1) relates that the Indian women made pottery, building up the vessel by coiling, the surface being smoothened by the application of a pebble wet in water. The ware was burned in pits with dried bark, being afterward varnished with cimiri.

Gumilla (2) relates of the Ottomacs that, «pendent que les hommes jouent, les femmes s'occupent à faire des marmites d'argile pour leur usage, comme aussi des plats, des écuelles, qu'elles vendent aux nations voisines. Mais ce que à quoi elles s'occupent le plus est à tisser des nattes, des mantes, des corbeilles (3) et des sacs avec le chanvre ou *pite* qu'on tire du *Muriche,* (1) ainsi que le practiquent les Guaraunos. »

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(1) Storia Americana. Speaking of woman's work he says: « I vasi di cucina, o buoni, o cattivi, gli fanno da per se stesse.» T. II. p. 315.

(2) Histoire Naturelle, civile e géografique de l'Orénoque. Tome I. p. 268.

(3) The making of baskets is man's work on the Amazonas.

Schombrugk (2) says that, without a wheel, the Indian women of Guiana manufacture pottery of almost classic forms, and approaching the Etruscan type, some of the vessels being so large as to be capable of holding twenty or thirty gallons. They are often ornamented with Greek and arabesque designs. (3)

In Dutch Guyana, the women are the potters. (4)

Turning now to the United States of Columbia, we find the same testimony, and the squaws of Caquetá are represented as making great pots for the holding of fermented drinks. (5)

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(1) The palm *Mauritia flexuosa,* called *miriti* on the Amazonas.

(2) Hakluyt Society. « Discovery of Guiana by Sir Walter Raleigh», p. 64, note.

(3) Schomburgk, "On the Natives of Guiana.' Journ. Ethn. Soc., London, 1848, Vol. I. p. 267.

(4) Art de Vérifier les Dates. T. 15. p. 285. Pottery in Guyana made by the mother of the family. See "An Essay on the Nat. Hist. of Guiana", p. 278.

(5) " . . . . sus mujeres saben tejer canastros i cintas de algodon bien labradas para atarselas a las piernas i brazos. Construyen tanbien con la caña brava pienes particulares, i fabrican ollas i grandes cántaros en que depositan las bebidas fermentadas de que son tan amantes, sus maridos " etc.. etc. Codazzi. *Descripcion jeneral de los indios del Caquetá,* in the work of Perez entitled *Jeographia de los Estados Unidos de Columbia.* Tomo I, p. 485.

For an idea of the Pottery of Guayaquil, see Bulletin de la Soc. d'Anthropologie de Paris. Tome I, Ire. Série, 1866, p. 4:3.

In Guatemala the women made pottery as Palacio (1) testifies.

Of the mode of fashioning earthenware among the ancient peoples of Central America and Mexico, I have been able to find no historical evidence. The ancient pottery of the region was very fine, much resembling that of Peru, but of more classic design. Much of it appears to have been moulded. Gomara says that beautiful pottery of all kinds abounded in the market of Mexico. (2)

For the following account of ceramic art in Yucatan, I am indebted to a letter from Dr. Behrendt of New-York who says « There is really not much to be said about the ceramic art among the modern Mayas. Yucatan is, by this time, too far advanced in civilization, (or rather in borrowing the implements of foreign civilization), to preserve much of the ancient customs in home-industry. Even in the Indian villages one finds more of foreign than of domestic pottery. There are, however, certain classes of pottery manufactured in some towns of the interior which are not only carried all over Yucatan, but also exported to other parts of Mexico, and even to Havana; among them peculiar unglazed basins for cooling drinking water, of this form, some 6—8 inches in diameter at the mouth; also large and small water-jars, some preserving the ancient Yucatan forms, others imitating forrign models. These are made by men, mestizoes, and mostly by hand, on the turning-wheel.»

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(1) Palacio says that in Aguachapa, " Hacese en él la mejor e mas galana loza al modo de los Indios, que hay en estas provincias. Principalmente la hacen, i es officio de las mujeres, las cuales labran sin rueda ni instrumento alguno mas que preparan, el barro con las manos lo adelgazan i yguolan de maneira que hacen muy bien cualquier vasija que les mandan. " *Squier, Rare and Original Documents and Relations, p. 46.*

(2) Biblioteca de Autores Españoles. Historiadores primitivos de las Indias. Tom. I. p. 348; See also Antiquités Mexicaines, Paris 1828; Brongniart, Arts Céramiques. Tom. I. p. 516, and the Catalogue du Musée Céramique.

«In some places far away in the interior or without regular connection with the larger centres of trade, as also in Peten, the proceeding is still more primitive, and is exclusively in the hands of women. They search for the clay, load it on the backs of children, and work it on the metate before fashioning it with their hands. Large jars they generally form from two pieces. I have not seen that they mix their clay with ashes; but they often mix different kinds of clay together. The class of pottery used by the poorer people comprises the *comal* (flat plates to bake tortillas on), *cajetes* or small plates (saucers) for certain dishes etc. No kind of glazing is used for this kind of pottery, but in its place a varnish is sometimes used made from the Niin (*Coccus Axin* Lallave), and this is occasionally painted. It is an ancient proceeding. I possess a vase, dug out at Jaina (a farm on the Gulf Coast north of Campeche) while I was in the neighborhood, whose varnished and painted outer surface imitates admirably the design of ash wood. The pottery of the ancient Mayas shows great variety in form and in structure. Clay of different colors (dark red, light slate color, light and dark red, and brown) is sometimes mixed with mica or shell-gravel, and other substances, such as, in other parts, even wash gold (Zapotècos). The ornamentation consists of figures and arabesques, sunk or scratched into the surface, or elevated in reliefs and often painted.»

«The modern pottery of the Indians is generally plain. The ancient pottery found in the interior, and particularly near the gulf-coast of Yucatan shows a much higher art than that from the East coast, Cozumel Island etc. »

Pottery making fell to the lot of the Carib women, (1) and, according to Ligon, they manufactured a very handsome light ware. (2)

The Hon. E. G. Squier (3) describes the pottery of Nicaragua as painted and glazed, like that of the Amazonas spoken of by Edwards. The ceramic artists among the Indians of Fort Yuma, California, are women, (4) and the same is the case with the Zuñis, (5) whose beautiful painted pottery closely resembles that of the ancient Indians of Pacoval.

I have already quoted Dumont on the manufacture of pottery by squaws in Louisiana.

Du Pratz (6) says that the Indian women not only make the pottery, but they dig up and mix the clay. He describes them as «tolerable artists; they make kettles of an extraordinary size, pitchers with a small opening, gallon bottles with long necks, pots or pitchers for their bear's oil which will hold forty pints: lastly, large and small plates in the French fashion. I had some made out of curiosity upon the model of my Delf ware, which were a very pretty red. »

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(1) De la Borde, Relations de l'origine, mœurs, coutumes, religion, guerres et voyages des Caraibes, sauvages des isles Antilles de l'Amérique, Recueil de divers Voyages, p. 23.

(2) Mc. Culloh. Researches Philosophical and Antiquarian concerning the Aboriginal History of America, p. 84.

(3) Nicaragua. Vol. I. p. 287.

(4) Michler's Reports. U. S. and Mex. Boundary Survey. Vol. I. p. 1)1.

(5) Pacific R. R. Report. Vol. III. p. 5).

(6) Hist. of Louisiana, London, 1774, p. 360.

Adair (1) informs us that the Cherokees glaze their ware, and make it very black and firm by placing it in the smoke of a pitch-pine fire.

Hariot (2) says of the natives of Virginia : « Their women know how to make earthen vessels with special cunninge, and that so large and fine that our potters with thoye wheles can make noe better»; while Campbell, (3) describing the same Indians says :—« Labor they despised and assigned to the women. They made mats, baskets, pottery; hollowed out stone mortars, pounded corn, made bread, cooked, planted corn, gathered it, carried burthens,» etc.

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(1) Hist. of American Indians. London. 1775. p. 4.

(2) « A Briefe and True Report of the Newfound Land of Virginia etc. » De Bry. 1590.

(3) History of Virginia. p. 28. see The True Travels etc. of John Smith, p.131, and Strachey. The Historie of Travaile into Virginia Britannica, p. 112.

Bartram says that among the Georgia Indians «the men perform nothing except erecting their mean habitations, forming their canoes, stone pipes, tambours, eagle's tail or standart and some other trifling matters; for war and hunting are their pricipal employments. The women are more vigilant, and turn their attention to various manual employments: they make all their pottery or earthenware, mocasins, spin and weave the curious belts and diadems for men, fabricate lace, fringe, embroider and decorate their apparel, etc. » (1)

Among the Iroquois (2) and Hurons (3) we find the same social rule observed. Schoolcraft says (4): — « It is believed that this art, in this quarter, was in the hands of females; but every female or mistress of a lodge was not adequate to it. It must have been the business of a class of persons in each village, who were professed potters.

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(1) Travels through North and South Carolina, Georgia, etc. London, 1792. p. 511.

(2) Schoolcraft, vol. III. p. 81.

(3) Parkman. The Jesuits in America. Introduction. p. XXX.

(4) Notes on the Iroquois, p. 223. Squier and Davis.

Tradition says that it was the practice to mingle some blood in wetting and tempering the clay. »

The following account of pottery manufacture among the Indians west of the Mississippi given by Hunter, I have extracted from Professor Rau's (1) paper:

« In manufacturing their pottery for cooking and domestic purposes, they collect tough clay, beat it into powder, temper it with water and then spread it over blocks of wood which have been formed into shapes to suit their convenience or fancy. When sufficiently dried, they are removed from the moulds, placed in proper positions and burned to a hardness suitable to their intended uses. Another method practised by them is to coat the inner surface of baskets made of rushes or willows, with clay, to any required thickness, and when dry, to burn them as above described. In this way they construct large, handsome, and durable ware; though latterly, with such tribes as have had much intercourse with the whites, it is not much used, because of the substitution of cast-iron ware in its stead. »

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(1) Hunter. Manners and Customs of Several Indian Tribes West of the Mississippi. Philadelphia. 1823, p. 296, quoted by *Rau, Indian Pottery, Smithsonian Report, 1866, p. 351.*

« When these vessels are large, as in the manufacture of sugar, they are suspended by grape-vines, which, wherever exposed to the fire, are constantly kept covered with moist clay. Sometimes, however, the rims are made strong and project a little inwardly quite round the vessel so as to admit of their being sustained by flattened pieces of wood, slid underneath these projections and extending across their centres. »

Among the Mandans, women were, as elsewhere, the makers of earthenware. Catlin (1) says: — « I spoke of the earthen dishes or bowls in which these viands were served out. They are a familiar part of the culinary furniture of every Mandan lodge, and are manufactured by the women of this tribe in great quantities, and modelled into a thousand forms and tastes. They are made by the hands of the women, from a tough black clay and baked in kilns which are made for the purpose, and are nearly equal in hardness to our own manufacture of pottery, though they have not yet got the art of glazing, which would be to them a most valuable secret »

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(1) Manners and Customs of the North American Indians. Letter. 16.

Among the Micmac Indians of Acadia, the birch-bark vessel, in which cooking is performed, is made by the woman, and we have already seen how she prepares, among the Esquimaux, the stone lamps and cooking vessels.

Of the manufacture of pottery by the ancient people of Europe, I have not been able to obtain historical information.

Jewett (1) thinks the Celtic funerary urns were formed « most probably, judging from the delicacy of the touch, and from the impress of the fingers which occasionally remain, by the females of the tribes »

Professor Hughes of Cambridge University, England, has informed me that at Ordezan, near Bagnière de Bigorre, pottery similar to that found in caves, is still manufactured by women. Tylor speaks of a set of hand-made pottery found in use by an old woman in the Hebrides. It would be interesting to know whether it was made by her own hands.

Notwithstanding the voluminous literature on Africa, it is perfectly surprising to see how little is said concerning its aboriginal pottery, but I have, however, been able to cull a few facts of importance.

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(1) Jewett. Grave Mounds and their Contents. p. 83—85

The Kaffir (1) women not only cook, but they make the pots they use, the clay for the purpose being obtained from ant-hills. They also make baskets that will hold milk or beer.

The following description of the manufacture of earthenware in Eastern Africa is from Burton: (2)

« The figuline, a greyish brown clay is procured from river beds, or is dug up in the country ; it is subjected to the preliminary operation of pounding, rubbing dry on a stone, pulverizing and purifying from stones and pebbles. It is then worked into a thick mass with water, and the potter fashions it with the hand, first shaping the mouth ; he adds an inch to it when dry, hardens it in the sun, makes another addition, and thus proceeds till it is finished. Lines and other ornaments having been traced, the pots are baked in piles of seven or eight, by burning grass—wood fire would crack them, consequently the material is always half raw. Usually the color becomes lamp-black;—in Usagara, however, the potter's clay burns red like the soil—the effect of iron. »

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(1) Wood. Uncivilized Races, p. 77. 143. See also Campbell. Travels in South Africa. p. 523.

(2) This extract is without reference in my notes.

« A cunning workman will make in a day four of these pots, some of them containing several gallons, and their perfect regularity of form, and often their picturesqueness of shape, surprise the stranger. The best are made in Ujiji, Karagwah, and Ugunda, those of Unyamwezi are inferior, and the clay of Zanzibar is of all the worst. »

It will be remembered that the tribes on the east coast of Africa have made a considerable progress towards civilization, so that pottery manufacture has, among the most of them, become a profession; passing into man's hands.

Schweinfurth (1) in describing the people of Monbuttu, makes the most important statement that, « as in the case with the majority of the inhabitants of Africa, the manufacture of pottery is practised by the women ».

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(1) «Wie bei den meisten Bewohnern Afrika's wird die Töpferei, das Schmiedehandwerk ist naturgemäss auf die Männer beschränkt, von Weibern ausgeübt, mit den Künsten der Holtzschnitzerei und Korbflechterei sind beide Geschlechten vertraut.» *Ueber das Volk der Monbuttu in Central Africa. Zeitschrift f. Ethnologie IIIcr. Jahrg, 1873. Heft, 1, S. 8.*

In Yoruba, says Bowen (1) « The women again make earthen pots », and so also do those of Garo-a-Bautschi and Fesan, (2) and the Rev. Mr. J. Leighton Wilson, for many years a resident on the Guinea coast, tells me that, in this region, the ceramic art is entirely in the hands of females. (3) We are therefore, I think, justified in coming to the conclusion that the law that the fictile art, in its infancy, is confined to women, will be found to hold good for Africa as well as America.

In Asia, the potter's wheel has been known for thousands of years, and its use has extended over the greater part of the continent. Tribes exist that still make pottery by hand, but I have found nothing of importance concerning them.

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(1) Central Africa. p. 308.

(2) Speaking of the natives of Garo-a-Bautschi, Schweinfurth says : — « Die Männer beschäftigen sich ferner mit Mattenflechten, Korbmachen und den anderen Handwerken, als der Verfertigung von Schuhen, Leder, Gefässer, etc., während die Frauen die Töpferei besorgen. Auch in Fesan bemerkte ich, dass die Frauen Töpfe verfertigen, » u. s. w.

(3) In connection with African pottery I would call attention to the enormous corn jars in use by many tribes. Those of the Bechuanas are shaped like the oil jars of Europe. They are made of twigs and sticks, and plastered both inside and out. They are sometimes 6ft. high and 3ft. in diameter. The similar jars of the Damaras are said to be made of palm leaves and clay.

In the East Indian Archipelago, I find that the Papuan (1) women make pottery.

While pottery is unknown in the greater number of the South Sea Islands, in Fiji it has reached a high state of development.

According to Williams and Calvert, (2) various utensils in brown and red ware are produced. « The drinking cups are often prettily designed, some being globular, some urn-shaped, others like three or four oranges joined together, the handle springing from each, and meeting at the top: others again are made in the form of canoes. Earthen arrowroot pans, dye bowls and fish pots are in great demand. A very neat bowl is made in imitation of a ribbed flower. The greatest call however is for cooking pots. Several of these are found in every house; and as they are not very durable, the demand is brisk. I saw one large pot capable of holding a hogshead, and having four apertures to facilitate its being filled and emptied. Ordinary cooking vessels contain from five to ten gallons, and their shape seems to have been suggested by the nest of a sort of black bee common in the islands. In the manufacture of their pottery, the Fijians employ red and blue clays tempered with sand. Their apparatus consists merely of a cushion, four flat mallets, (1) and a round flat stone; and yet the pots are often made with as true an outline as if they had been turned with a wheel. Lines and figures are traced on the vessel while yet moist; and, after drying for a few days, a number of them are placed together and covered with very light fuel; such as reeds, nut leaves, grass, etc. This is set on fire, and, by the time it is burned out, the pots are baked. While yet hot, such as are to be glazed are rubbed over with the resin of a species of pine. »

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(1) Journ. of Indian Archipelago. Vol, V., p. 313 refers t. Papuans at Dori. Also Norris' Ethnogr. Lib, conducted by Edw. Norris. Vol I., in Native Races of the Indian Archipelago, Papuans, by George Windsor Earl. p. 73.

(2) Fiji and the Fiji Islands. New-York 1859. p. 53. See also Wood, « Uncivilized Races ». Amer. Ed. p. 930.

« They are now fit for the market.

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(1) Wallace, in his work on the Malay Archipelago, figures a mallet used in the fabrication of pottery.

Women have the making of pottery entirely in their own hands, and the art, moreover, seems to be confined to the women of sailors and fishermen. » (1)

The earthen pots used for the cooking of human flesh in the Fiji Islands (2) are made especially for that purpose, as appears to have been the case also among the Tupinambâs in Brazil.

Jenkins gives a description of the manufacture of pottery by the same people. «Their cooking», says he, «is principally performed by steam. For this purpose they use earthen pots made by themselves, in which their food is placed with a small quantity of water. These pots are manufactured by women who follow this employment only. They are made of clay which is first fashioned into nearly the desired shape with the hand; a smooth round stone is then inserted and the clay beaten and moulded about it with a mallet. If the vessel is to have but a small opening, it is first made in two or more pieces, which are afterward joined together with great skill. Figures are traced upon them, if required, with the fibres of a cocoa nut leaf.»

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(1) It is worth noting that the Fiji women are skilled in the manufacture of stamped bark cloth, making the patterns themselves.

(2) Jenkins. U. S. Exploring Expedition. p. 341.

«The pots are now baked before an open fire, and finished by glazing and varnishing them with the resin of the Feejee pine, mixed with a decoction of the mangrove bark. » (1) Pickering (2) says that the glazing was done by applying the resin of a species of Dammara, closely allied to the Kauri of New-Zealand.

In the Tongan Islands which lie to the eastward of the Fijis, the women, according to Wood, (3) are the potters.

The facts I have given seem to show that, among savage tribes generally, the fictile art is, at first, exclusively practised by woman, the reason being that, primarily and essentially, the fabrication of earthenware is a branch of culinary work, which last, everywhere falls to the lot of the gentler sex. Man, among savages, is the hunter, fisher, and warrior, while the woman takes care of the house, and of the culture of the field. When, however, in the progress of the tribe in culture, the practice of the art of pottery comes to be a profession, and to interfere with household work, it passes naturally into the hands of man, and it will be found that, in every case where men make earthenware, the tribe has advanced considerably beyond the savage state.

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(1) Jenkins. U. S. Exploring Expedition. p. 347. See also Lubbock. Prehistoric Times. p. 443.

(2) The Races of Men. p. 163.

(3) Uncivilized Races, p. 983 (Amer. Ed.) See also Jenkins. U. S. Exploring Expedition. p. 320.

But savage woman not only fabricates vessels of clay; she also ornaments them, and if the fictile art has originated with her, and has grown up under her hands, it seems no less probable that the ornaments she uses should have originated with her, and the probability is increased by the fact that, to her, falls the work or spinning and weaving, of making and decorating personal ornaments and clothes, and of making baskets, mats etc. She is everywhere the primitive decorative artist, and to-day it is the exception that man occupies himself with ornamental art, even in civilised countries. Woman covers with ornament every thing her hand touches, and the lady in her boudoir industriously embroiders, on some article of mere luxury, the same series of frets and scroll borders, that, on the Amazonas, the savage, unclothed squaw, as diligently and with a firm a hand, traces with a spine on the damp surface of the clay vessel she is fashioning. It is as if they both sang the same simple song. The ornaments in both cases are identical, and not only of wholly independent origin, but it may be also of very different age. Those of the savage, are the mere embryonic beginnings of art-life, while those of the boudoir, like the *Lingulae* of to-day, are archaic forms, persistent through the geological ages, still flourishing unchanged among the varied wealth of derivatives by evolution from the ancient primary forms.